User manual

Pneumatic Drive System

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Pneumatic Drive System for the MDAC high pressure cell : PDS 200

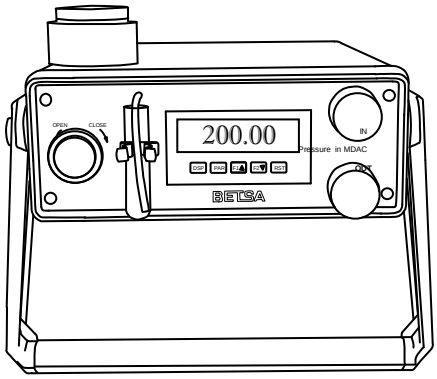
The Pneumatic Drive System is used to control the force applied to the MDAC anvil by varying the pressure in its membrane.

The small size, weight, and portability of the PDS allow its use in a variety of environments.

Features:

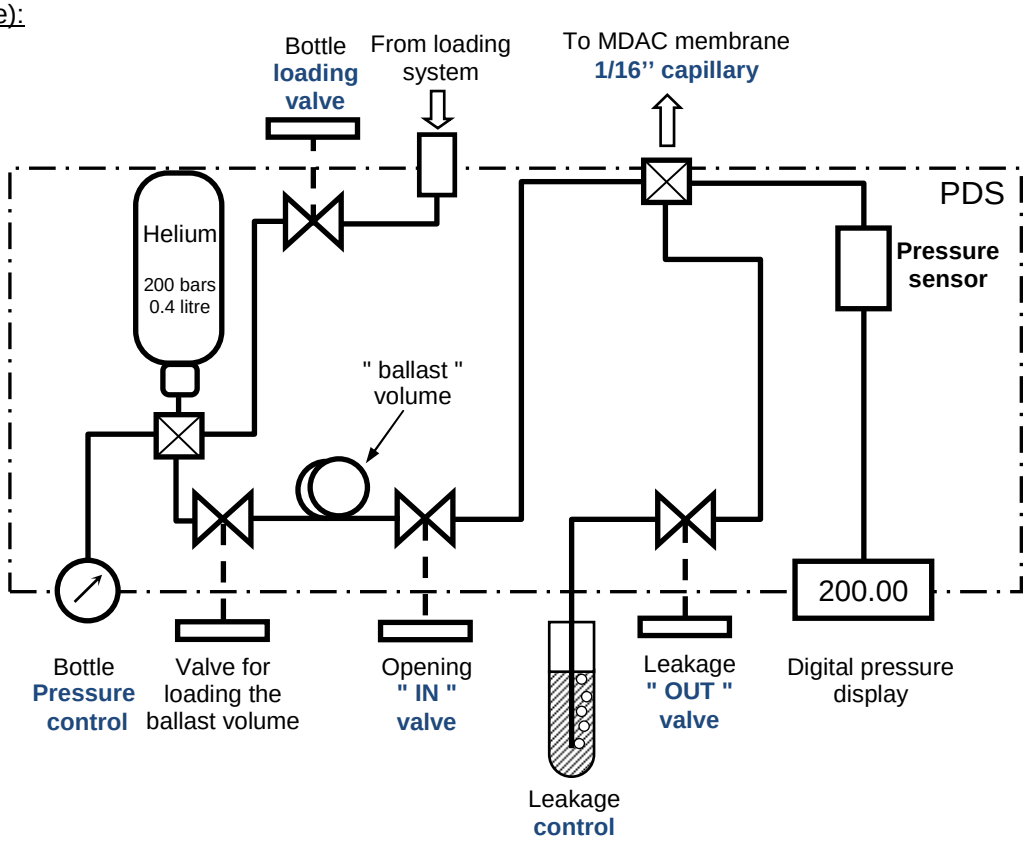
Ref : **[PDS 200]**

- 0 to 200 bars **Pressure range**.
- Digital **Pressure display** with a 0.01 bar resolution.
- Fine and continuous **Pressure control** with 2 valves (" IN " and " OUT ")
- **0.4 l Bottle** filled with helium (200 bars) allows for many pressure cycles before reloading.
- **High pressure connection** for the output (on the rear panel)**:** Nova Swiss female for 1/16'' capillary.
- **High pressure connection** for loading (on the rear panel)**:** Tube ¼'' Gyrolock female.
- **Portable** Size : 260 x 150 x 400 mm; Weight : 6,300 Kg.



*The **PDS** can drive any **MDAC** cell (with specific high pressure fitting).*

PDS (Principle):



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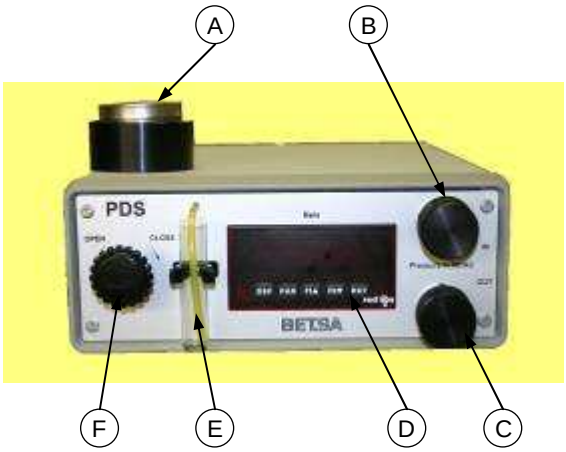
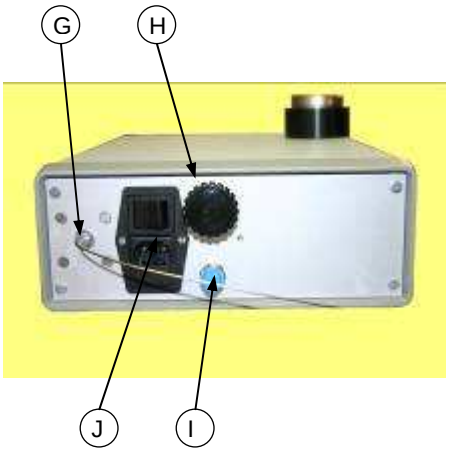
DESCRIPTION

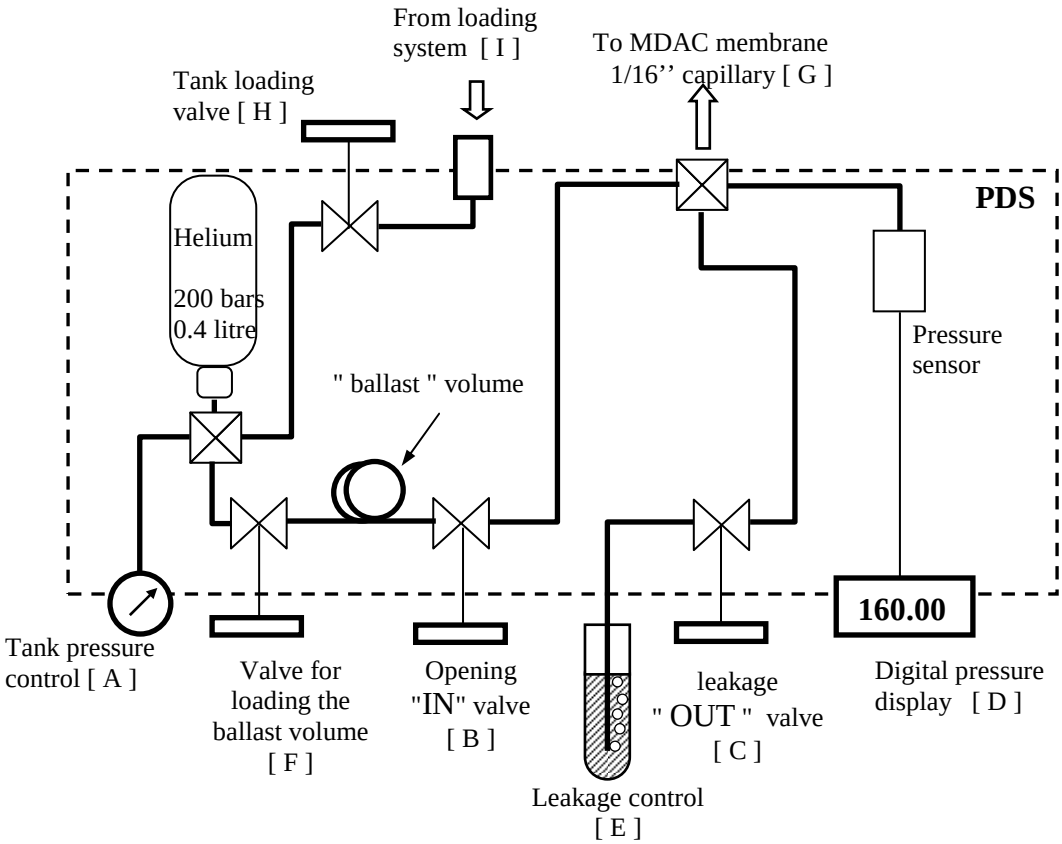


Front panel



Rear panel

A	Manometer (0 to 250 bars) to visualize the pressure in the internal tank
B	Button to control the **MDAC** membrane pressure **(IN)**
C	Button to control the **MDAC** membrane pressure **(OUT)**
D	Digital display of pressure applied to MDAC (in bars)
E	Tube with liquid to visualize (small bubbles) very small pressure decrease (controlled by [C] valve)
F	ON/OFF valve for reloading internal ballast volume from internal tank (open reverse clockwise
G	Pressure connection to **MDAC** (Female "Nova Swiss" connector for 1/16" capillary)
H	ON/OFF valve to reloading tank
I	Pressure connection to loading system (Female Gyrolock connector for 1/4" tube)
J	Electrical connection (220 V 50 / 60 Hz , Fuse 1A)


From loading system [I]
To MDAC membrane 1/16'' capillary [G]
Tank loading valve [H]
PDS
Helium
200 bars
0.4 litre
" ballast " volume
Pressure sensor
160.00
Tank pressure control [A]
Valve for loading the ballast volume [F]
Opening "IN" valve [B]
leakage " OUT " valve [C]
Digital pressure display [D]
Leakage control [E]

PROCEDURES

1) RELOADING SYSTEM

1. **Turn off** (clockwise) the taps [B] , [C] and [F].
2. Connect your gas pressurising equipment to the connector. [I]
3. Adjust the pressure of the loading equipment to a pressure **slightly higher** than the pressure in the PDS (control the value on manometer [A])
4. Then **turn on** (reverse clockwise) the tap [H]. This tap connects the PDS sample bottle to the loading equipment.
5. **Increase slowly** (to prevent excessive temperature increasing of the sample bottle) the pressure of the loading equipment until the pressure in the PDS has reached the value you want (<200 bars)
6. **Turn off** the tap [H].
7. The gas reloading is now achieved.
8. Disconnect your loading equipment (Be sure their is no pressure in the circuit before disconnection)

2) FUNCTIONING

1	Pressure connection [G]to **MDAC** (Female "Nova Swiss" connector for 1/16" capillary)
2	Turn ON valve [F] for reloading internal ballast volume from internal tank (open reverse clockwise)
3	Turn OFF valve [F]
4	Turn ON valve [B] slowly to increase pressure in **MDAC membrane pressure**
5	Digital display of pressure applied to MDAC (in bars) [D]
6	Turn OFF valve [B] to maintain the pressure in **MDAC membrane pressure**
7	Turn ON valve [C] slowly to decrease pressure in **MDAC membrane pressure**
8	Visualize the liquid on tube [E] (small bubbles)

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SAFETY INFORMATION

Maximum Bottle Pressure : 200 bars (2900 psi).

Safety Factor : 1.5

For reloading a PDS, one may either

1- use a standard commercial bottle retailed at 200 bars (2900 psi): this is the ideal way to reload a PDS.

NEVER USE ANY BOTTLE PRESSURIZED ABOVE 200 BARS (2900 PSI).

OR

2- use of an external system. Be absolutely sure that in no circumstances the pressure exceeds 200 bars (2900 psi). For this reason, the external system should feature a pressure relief valve to ensure that this limit is never exceeded.

THE USE OF A COMPRESSOR IS STRICTLY PROHIBITED FOR RELOADING A PDS.

Safety Valve

PLEASE NOTE: THERE IS NO BUILD-ON PRESSURE RELIEF VALVE INSIDE OF THE PDS.

Bottle supply

The internal 0.4 liter gas bottle is to be inspected every 10 years.

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